Prof. Cope communicated a paper entitled "Fourth Contribution to the History of the Permian Formation of Texas." (See page 628.)

The action of the Curators was approved in regard to lending for scientific examination the Mexican flutes belonging to the Cabinet of the Society, deposited at the Academy of Natural Sciences.

Dr. Frazer took occasion from Dr. Brinton's remarks prefatory to the reading of Prof. Crane's paper, to express his views regarding the presumptive restriction of authors of papers from using already published matter in said papers. Mr. E. K. Price and Mr. Fraley explained the habitually liberal policy of the Society in respect of communications made for publication. Mr. Lesley expressed the hope that the broadly "philosophical" character of the Society would be maintained, and that the Proceedings would not become restricted to the narrow limits of Natural History or the Physical sciences, so called, but that the Society would encourage its members to communicate for publication their best mature thinking in whatever department of human knowledge they might engage.

Pending nominations Nos. 979, 981 to 984 were read, and the meeting was adjourned.

Stated Meeting, April 6, 1883.

Present, 13 members.

President, Mr. FRALEY, in the Chair.

Memberships accepted: G. Planté; J. B. Lawes.

Membership declined: Jos. May.

Letters of acknowledgment were received from the Royal Society of New South Wales (107–111); M. Edw. Dupont (111); Geological and Natural History Survey of Canada,

Toronto (57-60, 61-62, 67, 69, 75, 87; III, IV, V); Smithsonian Institution (112); and Mr. Thos. C. Porter (112).

Letters of envoy were received from the Geological Survey of India; University at Lund; Batavian Society, Rotterdam; Oberhessischen Gesellschaft, Giessen; and the Meteorological Office, London.

A letter of envoy, requesting exchanges, was received from the Historical and Scientific Society of Manitoba, Winnipeg, March 20, 1883. [See below.]

Donations were received from the Academies at St. Petersburg, Copenhagen, Brussels, Rome, Madrid and Philadelphia; the Royal Societies, in N. S. Wales, Victoria, Rotterdam and London; the Royal Astronomical Society at London; the Royal Society of Antiquaries, Copenhagen; the Geological Society at Halle; the Geological Surveys of India, New York, and New Jersey; the Geographical Societies at Paris and Bordeaux; the Historical Societies in Providence, Wilkesbarre and Winnipeg, Manitoba; the Swedish Bureau of Statistics; Lund University; Upper Hessian Society; General Society of Prisons at Paris; Observatory at San Fernando; the Revista Euskara; London Nature and National Review; Boston Society of Natural History; S. H. Scudder; H. A. Hill; Silliman's Journal; Franklin Institute, American Journal of Pharmacy, American Journal of Medical Sciences, T. Dudley, H. Phillips, Jr., H. C. Lewis, Dr. J. G. Lee, P. P. Sharples, of Philadelphia; American Chemical Journal; F. B. Hough, of Washington; Ohio Mechanics' Institute; National Mexican Museum.

A letter from Mr. Moncure Robinson was received accepting his appointment to prepare an obituary notice of Henry Seybert.

The death of Daniel B. Smith, at Germantown, March 29th, in the 92d year of his age, was announced by Mr. Fraley; and Prof. P. E. Chase was appointed to prepare an obituary notice of the deceased.

Mr. Davis read a paper "On the conversion of chlorine

into hydrochloric acid, as observed in the deposition of gold from its solution by charcoal."

Prof. E. W. Claypole communicated, through the Secretary, two papers entitled, "On the Kingsmill white sandstone," and "Note on a large fish-plate from the Upper Chemung (?) beds of Northern Pennsylvania."

Rev. J. Hagen, S. J., Prof. College of the Sacred Heart, Prairie du Chien, Wis., communicated, through Dr. Brinton, a paper entitled, "On the reversion of series and its application to the solution of numerical equations."

Mr. John Sharples communicated through Prof. P. E. Chase, a paper entitled, "The latitude of Haverford College."

Mr. Lockington read a paper entitled, "The role of parasitic protophytes; are they the primary or the secondary cause of zymotic diseases."

Dr. Barker exhibited two bronze medals which he had received, in Paris, as a delegate to the International Congress of Electricians, and as a Commissioner to the International Exhibition of Electricity, held in Paris in 1881; and also a medal struck by the Institut de France in commemoration of the transit of Venus.

Pending nominations Nos. 979, 981–984, and new nomination No. 985, were read.

The Historical and Scientific Society of Manitoba, Winnipeg (see its letter, March 20), was ordered to be placed on the list of corresponding Societies to receive the Proceedings from date.

Dr. Brinton in behalf of the owners offered some valuable documents. On motion, the President was requested to examine them and report to the Society.

The Finance Committee reported "that in the matter of the Magellanic Fund referred to it, the subject was considered, assisted by the President, and it was concluded that no change in the present regulations was needed." Report accepted.

The Secretaries were authorized to publish with Mr. Hale's paper on the Tutelo Indians a fac-simile photograph of the old Tutelo Chief, the last of his tribe. (See No. 114.)

The Committee on the Michaux Legacy reported as follows:

"That the appropriation made for a course of lectures in Fairmount Park for 1882 by Professor Rothrock, to wit, two hundred and eighty dollars for the Professor, and fifty dollars for advertising, was duly received from the Treasurer, and applied as intended.

"The lectures, fourteen in number, were upon the subjects in the annexed printed schedule; and were attended by increased numbers of citizens of both sexes. There is a growing interest in these subjects in our community, amply to justify the Society's appropriation in that direction. The Committee recommend the same amounts to be voted for 1883, for lectures as in Schedule No. 2, annexed."

It was then, on recommendation of the Committee,

Resolved, That an appropriation be made from the Michaux Legacy of two hundred and eighty dollars for Professor Rothrock's lectures in Fairmount Park, and fifty dollars for advertising them, and that the Treasurer be authorized to make payments under the direction of the Chairman of the Committee on the Michaux Legacy.

The following schedule of proposed lectures for 1883 was appended to the report:

Free Lectures in Fairmount Park, on Botany and Tree Culture, by Professor Rothrock, on Saturdays, at 4 P. M.

April 21. The value of Science to Mankind.
" 28. Young Plants; how studied in life.
May 5. Relations of Plants to National Prosperity.
" 12. The Microscope; what it is; what it does; how to use it.
" 19. A thriving colony on a Spruce Tree.
" 26. What the Leaves do, and how they do it.
June 2. Wasted food.
Sept. 8. The Forests of the Sea.
" 15. The American Forests, and their special importance.
" 22. American Timber, and its special value.
" 29. Old and new systems of Classification.
Oct. 6. Vegetable Units, and how they make the plant.

The Curators reported the safe return of the Mexican flutes borrowed by Mr. Cresson, and studied by Mr. Cox,

who had obtained from them a diatonic scale of an octave and a quarter in extent.

The Librarian reported the completion of his MS. condensed copy of the early records of the Proceedings of the Society from 1744 to 1837. The subject of printing the same was referred to the Committee of Five (Phillips, Horn, Lewis, Brinton and Law) appointed December 16, 1881.

And the meeting was adjourned.

On the Measurement of Electromotive Force. By George F. Barker.

(Read before the American Philosophical Society, January 19, 1883.)

The term electromotive force is applied to that force which tends to set electricity in motion. It appears to have been used first by Ohm, who in 1827 gave precision to the study of electric currents by formulating his well known law:—The strength of an electric current is directly proportional to the sum of the electromotive forces and inversely proportional to the sum of the resistances in the circuit.

The measurement of electromotive force may be absolute or relative; absolute when it is determined directly, relative when its value is obtained by comparison, the ratio of an unknown to a known electromotive force being the object of the measurement. In both measurements, the final standard of electromotive force is an absolute unit, based upon the fundamental units of mass, length and time; since these are respectively the centimeter, the gram and the second, absolute units are often called C. G. S. units. In electrostatics, electromotive force and difference of potential are synonymous, the same unit being used for both. The unit difference of potential exists between two points, when to carry a unit of positive electricity from one to the other, requires the expenditure of a unit of work; or in the C. G. S. system, of an erg. Now a unit of work, *i. e.*, an erg, is done when a unit of force, *i. e.*, a dyne, overcomes resistance through an unit of distance, *i. e.*, a centimeter. And a unit of force, *i. e.*, a dyne, is that force which produces a unit of velocity in a unit of time; *i. e.*, produces an increase of velocity of one centimeter in one second. Since in this latitude, gravity produces a velocity of about 980 centimeters per second, the force of a dyne corresponds to the attractive force which the earth exerts upon the 1-980th part of a gram. To raise one gram therefore to the height of one centimeter requires the expenditure of 980 ergs of work. Obviously then if two electrified bodies at unit distance attract or repel each other with a force equivalent to that which